SITE HEALTH AND SAFETY PLAN

EMERGENCY RAPID RESPONSE SERVICES

VASQUEZ\I-70 SITE
(aka NORTH DENVER SOILS SITE)
DENVER, COLORADO

Prepared for

U.S. Environmental Protection Agency
Region VIII
999 18th Street
Denver, Colorado 80202-2405

September 1998

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DRAFT
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Reviewed By:

ECC Sr. Response Manager — Date: 10/19/98

EPA On-Scene Coordinator — Date: 10/21/98

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LIST OF ACRONYMS

ACGIH	American Conference of Governmental Industrial Hygienists
APR	Air Purifying Respirator
C	Ceiling Value, Not to be Exceeded
CDPH&E	Colorado's Department of Public Health and Environment
CFR	Code of Federal Regulations
CNS	Central Nervous System
COC	Contaminants of Concern
CPR	Cardiac Pulmonary Resuscitation
CRZ	Contamination Reduction Zone
Ca	Possible Occupational Carcinogen
ECC	Environmental Chemical Corporation
EPA	Environmental Protection Agency
EZ	Exclusion Zone
HEPA	high efficiency particulate airfilter
IARC	International Agency for Research on Cancer
IDLH	Immediately Dangerous to Life and Health
GI	Gastrointestinal Tract
JRM	Junior Response Manager
mg/m^3	milligrams per meter cubed
mg	milligrams
mL	milliliters
MSDS	Material Safety Data Sheets
NAAQS	National Ambient Air Quality Standards
NIOSH	National Institute of Occupational Safety and Health
N.T.P.	National Toxicology Program
OSC	On-scene Coordinator
OSHA	Occupational Safety and Health Administration
PER	Permissible Exposure Limits
PPE	Personal Protective Equipment
ppm	parts per million
REL	Recommended Exposure Limits
RM	Response Manager
RQ	Reportable Quantity
SCBA	Self Contained Breathing Apparatus
SHASP	Site Health and Safety Plan
SHP	Safety and Health Program
SSHO/QCO	Site Safety and Health Officer/Quality Control Officer
SZ	Support Zone
yd^3	Cubic Yards

1.0 INTRODUCTION

The communities of Elyria and Swansea, located in the northern area of the City of Denver, were some of the first settlements in the Platte River Valley; they have an extensive history that dates back to the 1850's. Immediately west of these settlements, the community known as Globeville became a center for smelting and ore benefaction starting in the 1870's and continuing through the 1950's. Inefficient smelting techniques used by early smelters left large amounts of metals, including lead and arsenic, in the waste slag. Additionally, these primitive smelting operations typically produced stack emissions with elevated metal content. The heavy fallout of metal laden smelter dusts contaminated large areas around and downwind of the smelters, including the communities of Elyria and Swansea.

In 1997 and 1998, the State of Colorado's Department of Public Health and Environment (CDPH&E) and the Environmental Protection Agency (EPA) conducted sampling in these neighborhoods to assess the threat that the historic smelter dusts posed to human health and the environment. The resulting surface soil screening identified areas with lead and arsenic contamination at levels of concern.

The EPA issued a Delivery Order to the ERRS WEST contractor, CET Environmental Services, Inc., to provide labor, equipment, and materials to respond to the excavation, transport, disposal, and restoration operations planned for the North Denver Soils Site. Environmental Chemical Corporation (ECC), Region VIII Teaming Subcontractor, was issued a Task Order from CET to provide the required resources for the emergency response.

1.1 Purpose of Site Health and Safety Plan

This Site Health and Safety Plan (SHASP) was prepared by Environmental Chemical Corporation (ECC) for the EPA. This plan is based on all available site specific data. In addition to other regulatory requirements, all work will be performed in compliance with the Occupational Safety and Health Administration (OSHA) - Title 29 of the Code of Federal Regulation (CFR), Part 1910 and 1926. The contents of this SHASP are subject to review and revisions as new information becomes available.

1.2 Responsibilities of Site Health and Safety Plan

The requirements established by this SHASP are mandatory and apply to all CET and ECC employees, other CET subcontractors involved in implementing the described scope of work, and any other personnel entering regulated work areas during active field operations. CET/ECC is responsible for training all of its employees and subcontractors regarding the information and contents of the SHASP prior to the commencement of work. This document is to be read and understood by all site personnel and visitors. ECC will provide a copy of this plan to any

authorized personnel who must enter regulated work areas. Such personnel are required to sign the SHASP as an acknowledgment of agreement, acceptance, and understanding of the contents (Appendix A). ECC will maintain a copy of the SHASP for inspection and reference at the work site during each day of field operations.

The on-site ECC SSHO will be responsible for implementing this plan and will report directly to the Senior Response Manager (RM) on all project related health and safety matters. In the event that an emergency situation arises, the ECC Site Safety and Health Officer (SSHO) will coordinate with the EPA On-Scene Coordinator (OSC), as needed. The ECC SSHO has the authority to intercede directly to stop any unsafe practices.

1.3 Revision to Site Health and Safety Plan

Changes in the scope of work operations and changing or unanticipated site conditions may require modification and approval of the SHASP to maintain field safety in compliance with contract requirements and OSHA regulations. Work operations affected by the revisions will not proceed unless specifically authorized by the OSC. Only the OSC may authorize operations to continue while changes to the SHASP are under review by the contracting agency.

1.4 Implementation of Site Health and Safety Plan

Before activities begin on or around the site, a health and safety tailgate meeting will be held with site personnel to discuss safety procedures and to familiarize personnel with the potential hazards of the site. Site personnel will be informed of any modifications to the SHASP during the daily tailgate safety meetings or when site conditions and risks change.

The SSHO, or his designate, will perform daily safety inspections throughout the project to evaluate site operations. In addition, the SSHO will conduct a daily tailgate safety meeting with all site personnel.

1.5 Scope of Work

This project will proceed on a task-by-task basis. The field activities will be completed at the direction of the OSC and will include the following tasks:

- Excavation of lead and arsenic contaminated soils at the selected residential properties;
- Load and transport the excavated materials to the designated offsite disposal area;
- Restore excavated properties to "near original" condition by backfilling, revegetating, etc.; and
- Collect and dispose of miscellaneous debris and rubbish.

2.0 SITE LOCATION AND DESCRIPTION

2.1 Site Description

The North Denver Soils Site primarily consists of residential properties located in an area bounded on the south by Interstate Highway 70 (I-70), on the east by Colorado Boulevard, on the west by Vasquez Boulevard, and on the north by 52nd Avenue. The site and its boundaries are within the City and County of Denver.

2.2 Site Characteristics

The chemical contaminants presenting potential occupational and environmental health hazards at the North Denver Soils Site are heavy metal wastes. Previous investigations indicated significant concentrations of lead and arsenic in site soils. Wastes are reported to contain lead concentrations in excess of 1,500 parts per million (ppm).

2.3 Site Zones for Residential Activities

Site zones with definitive boundaries will be established during cleanup tasks to prevent or minimize exposure of unauthorized personnel to the project hazards by reducing migration of contaminants into clean areas. Residential tasks will utilize dry decontamination techniques for equipment and personnel hygiene after shift completion and at all daily breaks. The results of the residential air monitoring results in these limited contamination zones will be evaluated weekly to ascertain whether the proper decontamination procedures are being utilized.

2.3.1 Support Zone

The Support Zone (SZ) is the uncontaminated (clean) area containing resources to support project activities where personnel will not be exposed to hazardous materials. The office trailers housing EPA, CET/ECC, and other contractor personnel will be known as the Command Post and the surrounding area will serve as the primary SZ. Within the SZ, the following resources will be available: an effective means of communication, first-aid supplies, fire extinguisher, drinking water, and other appropriate support equipment. The SZ will serve as the main point of contact for visitor check-in and for the initiation of any necessary emergency services.

2.3.2 Contamination Reduction Zone

The Contamination Reduction Zone (CRZ) is the transition area between the contaminated area known as the exclusion zone (EZ) and the clean area (SZ), where equipment and personnel are decontaminated after leaving the EZ. This zone is designed to reduce the probability that the SZ will become contaminated.

The personnel CRZ will be located at the entrance to each residential property. This area will be equipped with brushes for dry decontamination. A container will be located in the area for disposal of the decontamination waste. If personal protective equipment (PPE) is used during this project, personnel will remove and/or decontaminate the PPE and place it in appropriate containers located in the CRZ. The Command Post wash room will be used for personal hand and face cleaning.

2.3.3 Exclusion Zone

The Exclusion Zone (EZ) includes the work activity area of the site where contamination may or does occur. The EZ will be clearly marked with flagging, barricade tape, traffic cones, or other indicators to limit access. An access control point will be established. Only authorized, trained, and qualified personnel with the appropriate PPE will be admitted. Personnel entering the EZ will use the buddy system.

2.4 Site Security Control

During residential removal actions, barrier tape will be posted around active construction zones and site hazardous areas. In the event a construction zone is moved or enlarged, taping will be moved to accommodate the zone perimeter change. Informational signs and yellow plastic barrier tape will be used to delineate site work areas or hazardous areas, such as the staging area.

2.5 Site Dust Control

The use of heavy equipment during the planned activities may create dust emissions. During the operations, water spraying will be implemented as a dust abatement measure to preclude the spread of dust. No visible dust emissions will be permitted. The soil surface on haul roads and on other areas disturbed by operations will be treated with dust suppressants, if necessary. Cleaning will be done by vacuuming, wet mopping, and wet sweeping. If there is mud or soil build-up on the roads adjacent to the operations, street sweeps will be utilized to keep the roads free from dust and mud. The SSHO and RM will visually evaluate and monitor the effectiveness of the dust control. Water will be used efficiently to prevent the creation of puddles or runoff.

3.0 HEALTH AND SAFETY PROJECT ORGANIZATION

Based on the scope of work, the ECC field work team will consist of the Response Manager (RM), Site Safety & Health Officer/Assistant Response Manager (SSHO), Site Superintendents, and Equipment Operators. This section presents discussions of the health and safety responsibilities of CET/ECC personnel, CET subcontractors, and authorized site visitors.

3.1 Organization and Safety Responsibilities

ECC has a definite line of reporting for individuals tasked with health and safety responsibilities. The health and safety responsibilities of the project team are outlined in the following sections.

3.1.1 Response Manager (RM): James Brenkendorff

Health and Safety Responsibilities:

- Ensure that the SHASP is approved by the contracting agency prior to commencement of operations;
- Ensure that all personnel assigned to the project are instructed on the work plan, operations to be performed, known and potential hazards associated with the work, SHASP requirements, proper use of required PPE, specified safe work practices, proper action in the event of a medical or chemical emergency, and related site specific safety information;
- Ensure that all field personnel, including any subcontractor personnel, assigned to the project satisfy all requirements for training and medical surveillance as specified by 29 CFR 1910.120, and that records of training and medical approval are available and maintained for each person;
- Ensure that required PPE, air monitoring instruments, and other safety related items are provided for the project;
- Monitor overall safety performance of field personnel, in coordination with the SSHO;
- Correct any work practices and/or conditions that may result in injury and/or exposure to hazards;
- Immediately stop ECC (including subcontractor) operations in the event of an emergency or serious hazard;
- Prepare and submit required work progress/accident history reports and air monitoring reports; and
- Maintain all required safety and health records (i.e. OSHA 200 Logs, Accident Reports, Records of Training, Safety Inspection Reports, etc.).

3.1.2 Junior Response Manager (JRM): Lloyd McKissick

Health and Safety Responsibilities:

- Assist the RM in directing operational activities;
- Ensure that all personnel assigned to the project are instructed on the work plan, operations to be performed, known and potential hazards associated with the work, SHASP requirements, proper use of required PPE, specified safe work practices, proper action in the event of a medical or chemical emergency, and related site specific safety information;
- Monitor overall safety performance of field personnel, in coordination with the SSHO;
- Correct any work practices and/or conditions that may result in injury and/or exposure to hazards;
- Immediately stop ECC (including subcontractor) operations in the event of an emergency or serious hazard;
- Prepare and submit required work progress/accident history reports and air monitoring reports; and
- Maintain all required safety and health records (i.e. OSHA 200 Logs, Accident Reports, Records of Training, Safety Inspection Reports, etc.).

3.1.3 Certified Industrial Hygienist: Bruce D. Lazarus, CIH

Health and Safety Responsibilities:

- Oversight and enforcement of the SHASP;
- Sign and date the SHASP prior to submittal;
- Evaluate air monitoring data and recommend changes to engineering controls, work practices, and PPE;
- Coordinate with SSHO for any on-site training;
- Maintain availability 24-hours/day for consultation with SSHO during on-site emergencies;
- Provide on-site consultation as needed;
- Coordinate any modifications to the SHASP with the RM, the Site Superintendent, the SSHO, and the OSC; and
- Provide continued support for upgrading/downgrading of the level of personal protection.

3.1.4 Site Safety and Health Officer (SSHO): Lloyd McKissick

Health and Safety Responsibilities:

- Supervise daily on-site implementation and enforcement of the SHASP;
- Remain on-site for the duration of field activities for Safety and Health related duties;
- Ensure site compliance with Federal, State, and OSHA safety and health regulations and all requirements of the SHASP including, but not limited to, activity hazard analyses, air monitoring, use of PPE, decontamination, site control, procedures used to minimize hazards, safe use of engineering controls, the emergency response plan, spill containment program, and documentation of the daily safety and health inspection results;
- Conduct all necessary on-site training;
- Stop work if unacceptable health or safety conditions exist, and take necessary action to re-establish and maintain safe working conditions;
- Consult with and coordinate any modifications to the SHASP with the ECC Safety and Health Manager, the CIH, the RM, the Site Superintendent, and the OSC;
- Conduct accident investigations and prepare accident reports. Appendix B contains the Incident/Accident Reporting Form;
- Inspect the safety and health equipment to assure proper operation and accuracy;
- Document the safety and health findings during daily inspections; and
- Recommend corrective actions for identified safety and health deficiencies and oversee the corrective actions in coordination with site management.

3.1.5 Field Personnel

Health and Safety Responsibilities:

- Follow the guidelines, rules, and procedures in this document;
- Act in a responsible and cautious manner in order to prevent accident, injury and/or exposure to themselves and their co-workers;
- Report recognized unsafe conditions and actions to the SSHO and/or the Site Supervisor;
- Report any and all accidents, injuries, exposures and/or near misses to the SSHO and/or the Field Supervisor;
- Attend and participate in daily tailgate safety meetings conducted during the project;
- Follow the instructions and directions of the SSHO and the RM;
- Utilize the PPE provided and specified;

- Follow all field safety procedures for safe work practices, buddy system, communication, site control, decontamination, evacuations and related emergency procedures;
- Perform only those tasks they are instructed to perform and they are trained, qualified, and capable of performing;
- Report to the RM or SSHO any condition they believe could affect their safety and/or the safety of co-workers; and
- Ensure that no work tasks are performed in deviation from the SHASP and/or the initial instructions of the Site Supervisor or SSHO without the expressed authorization and additional instruction from the Site Supervisor and/or SSHO.

3.1.6 Subcontractors

Health and Safety Responsibilities:

- Subcontractors have the same responsibilities as ECC field personnel (Section 3.1.5).
- Provide Material Safety Data Sheets (MSDS) for subcontractor-provided materials at the job site.

3.1.7 Authorized Site Visitors

Health and Safety Responsibilities:

- Receive site hazard and safety instructions from the SSHO;
- Review and comply with the SHASP;
- Use PPE to enter regulated work areas, when such controls are required for entry as per the SHASP; and
- Report any observed unsafe act and/or condition at, or affecting, the work site.

In addition, a Visitor Log will be maintained in the project trailer.

3.2 Site First Aid Requirements

Each CET/ECC staff member will obtain First Aid/Adult Cardiac Pulmonary Resuscitation (CPR) certificates. In addition, one or more designated persons on-site will be trained in First Aid/Adult CPR and hold current certifications. All individuals will be trained in universal precautions and the use of PPE as described in the Bloodborne Pathogens Standard 29 CFR 1910.1030.

4.0 HAZARD/RISK ANALYSIS

This section presents the hazard analysis summary for conditions and hazardous substance categories known to be present at the site. During the removal activities, all incidents, accidents, and potential exposures must be immediately reported to the ECC RM.

4.1 Chemical Hazards

The chemical contaminants presenting a potential occupational and environmental health hazard during the performance of work at the site (excavation, transporting, and backfilling) are the heavy metals lead and arsenic.

Table 1 presents a chemical hazard analysis for the contaminants of concern at the site. This hazard analysis outlines the exposure limits and characteristics of the site contaminants utilizing exposure and toxicity information generated by OSHA, the American Conference of Governmental Industrial Hygienists (ACGIH), the National Institute for Occupational Safety and Health (NIOSH), the National Toxicology Program (N.T.P.), the International Agency for Research on Cancer (IARC) and accepted industry data.

TABLE 1

SITE CONTAMINANT HAZARD ANALYSIS

Chemical	PER*/REL	IDLH	Route of Entry	Target Organs	Symptoms
Lead	0.05 mg/m^3 (OSHA) 0.10 mg/m^3 (NIOSH)	100 mg/m^3 (as lead)	inhalation, dermal contact, ingestion	eyes, GI Tract, kidneys, blood, gingival tissue, CNS	weakness, lassitude, insomnia; facial pallor; anorexia, weight loss, malnutrition; constipation, abdominal pain, colic; anemia; tremor; wrist and ankle paralysis; encephalopathy; eye irritation; hypotension; kidney disease
Arsenic	0.010 mg/m^3 (OSHA) Ca 0.002 mg/m^3 C (NIOSH)	5 mg/m^3	inhalation, dermal absorption, skin and/or eye contact, ingestion	liver, kidneys, skin, lungs, lymphatic system	ulceration of the nasal septum, dermatitis, Gastrointestinal disturbances, peripheral neuropathy, respiratory irritation, hyperpigmentation of skin

KEY: GI gastrointestinal; IDLH immediately dangerous to life or health; C ceiling value, not to be exceeded; mg/m3 milligrams per meter cubed; Ca possible occupational carcinogen; CNS central nervous system.

Note: * PELs (OSHA) are 10-hour Time-Weighted Average values

The potential toxic exposure hazard to site personnel of these chemicals can be expressed in Threshold Limit Values-Time Weighted Averages (TLV-TWA) as established by ACGIH, Permissible Exposure Limits (PER) as mandated by the OSHA, Recommended Exposure Limits (REL) as suggested by NIOSH, and by Immediately Dangerous to Life or Health (IDLH) values established by NIOSH and OSHA. These terms are defined as follows:
TLV-TWA - Airborne concentration of a substance to which nearly all workers (8 hours/day, 40 hours/week) may be repeatedly exposed, day after day, without experiencing adverse health effects. Exposure may be intensified by being absorbed by the skin, mucous membranes or eyes, either by airborne or by direct contact with the substance. Some substances have a ceiling value, which may not be exceeded during any part of the working day.
REL - Developed by NIOSH. RELs are published guidelines that recommend employee exposure limits for airborne contaminants. RELs are expressed as a TWA or ceiling limit.
PER - Established by Federal or State OSHA. PELs may be expressed as an 8-hour Time Weighted Average (TWA) or as a ceiling limit. PELs are enforceable by law. PELs may vary in comparison to the TLV-TWA levels (ACGIH) and RELs (NIOSH). All site activities will comply with the exposure standards mandated by OSHA, or the ACGIH TLV-TWA, whichever is more stringent.
IDLH - Defined as conditions that pose an immediate threat to life or health or conditions that pose an immediate threat or severe exposure to contaminants which are likely to have an adverse cumulative or delayed effect on health. If the contaminant concentration is above the IDLH levels, only a pressure-demand self contained breathing apparatus (SCBA), is allowed.

4.1.1 Exposures to Toxic Substances

Toxic or chemical active substances present a concern because they can be inhaled, ingested, injected, or absorbed through the skin. The effects of these substances can vary significantly. Two types of potential exposure exist:

- Acute: Exposures that occur for relatively short periods of time, generally from a few hours to 1-2 days. Concentrations of toxic air contaminants are high relative to their protection. Substances may contact the skin directly through splashes or immersion with potentially serious results.

- Chronic: Exposures that occur over longer periods of time, generally months to years. Concentrations of toxic air contaminants are relatively low.

Toxicity is the ability of a substance to produce an unwanted effect when the chemical has reached a sufficient concentration at a certain site in the body. A chemical may produce a toxic effect when it satisfies the following criteria:

- An observable or measurable physiological deviation has been produced in an organ or organ system. The change may be anatomic in character and may cause acceleration or inhibition of a normal physiological process or it may consist of a specific biochemical change.

- The observed change can be duplicated from animal to animal even though the dose-effect relationships may vary quantitatively.

- The stimulus has changed normal physiologic processes in such a way that a protective mechanism is impaired in its function of defense against other adverse stimuli.

- The effect is either reversible or at least attenuated when the stimulus is removed.

- The effect does not occur in the absence of a stimulus or occurs so infrequently that it indicates generalized or nonspecific response.

- The physiologic change reduces the efficiency of an organ or function and impairs physiologic reserve in such a way as to interfere with the ability to resist or adapt to other normal stimuli in either a permanent or temporary manner.

The continued health and safety of field personnel require that the hazards, real or potential, at a site be assessed and appropriate preventative measures instituted.

4.1.2 Routes of Entry

Chemical substances may occur in gaseous, liquid, or solid form. The substances may enter the unprotected body by inhalation, skin absorption, ingestion or injection.

- Inhalation: An important route of concern is inhalation, the lungs are extremely vulnerable to chemical agents. Evaluation of inhalation hazards is performed through air monitoring. This evaluation is used to determine the proper level of respiratory protection.

- Skin Absorption: Direct contact of the skin and eyes is another important route of entry. Chemicals may directly injure the skin or pass through the skin into the bloodstream. Proper protective clothing selection minimizes the risk of skin absorption.

- Ingestion: Ingestion is the least significant route of entry, yet it is important to be aware of how it occur. Personal habits, such as smoking, chewing gum, or eating at an area of potential contamination, may provide a route of entry for chemicals; therefore, these practices are not permitted on-site.

- Injection: The last primary route of entry is injection. Chemicals are introduced to the body through a wound, primarily puncture wounds. Proper protective equipment is provided to avert this hazard.

4.1.3 Contaminants of Concern

The following are the contaminants of concern (COC) for the site:

Lead

Inorganic lead absorption can result from inhalation of fine particles of metallic or soluble lead compounds when exposure occurs in excess of 50 μg of lead per cubic meter ($\mu g/m^3$) of air per 8 hours. The most common route of entry is through the respiratory tract. Evaluation of inhalation hazards will be determined through personal air monitoring (Section 9.2.1).

Inhalation or ingestion may cause headache, weakness, irritability, aching muscles, constipation, anorexia, abdominal pains, anemia, high blood pressure, fine tremors, and decreased hand grip. Chronic exposure to relatively low quantities of lead in humans can cause anemia, loss of appetite, intestinal cramps, and fatigue. The gastrointestinal adsorption and retention of lead is greater in children than in adults, so children are much more susceptible to the adverse effects of ingestion of lead in water, food, and dirt. Exposure over an extended period causes wrist drop, convulsions, coma, kidney damage, infertility in both sexes, fetal damage, and anemia. Lead is a cumulative toxin since the half-life of lead in the body is around 27 years. Bioaccumulation in humans and exposure to higher concentrations of lead can cause permanent neurological damage.

Lead absorption by the body is ascertained by the following:

- a systemic health history and a physical examination, including a neurological exam;
- a blood level over 40 μg /100 grams (g) of whole blood;
- hemoglobin below 13 gm (male)-12 gm (female); and
- possibly stippling of the red cells.

Medical surveillance will consist of an annual physical examination including blood sampling and analysis for lead and zinc protoporphyrin levels. The analytical results will be reviewed for any changes in the individual's baseline levels for lead and zinc protoporphyrin.

Arsenic

Airborne arsenic is largely trivalent arsenic oxide. Trivalent arsenic compounds are corrosive to the skin, mucous membranes, eyes, nose, and mouth. Wrists, genitalia, armpits, chest, and neck are sites of dermatitis. Perforation of the nasal septum may occur. Arsenic may produce keratoses, and possibly cancer. Acute inhalation may cause cough, chest pain, dyspnea, headache, and weakness. Medical surveillance will consist of an annual baseline physical with yearly follow-ups, or follow-ups as determined by the examining physician.

4.1.4 Training

ECC will provide an information and training program for all field personnel that may be subjected to exposure to the COCs above the action levels. The training program will consist of the following information:

- The content of 29 CFR 1910.1025 and its appendices regarding the chemical hazards of lead, required PPE including respirators, the PELs, medical monitoring, etc.;
- The content of 29 CFR 1910.1018 and its appendices regarding the chemical hazards of arsenic, required PPE including respirators, the PELs, medical monitoring, etc.;
- The specific nature of the project operations where exposure above the action levels is a possibility;
- The PPE requirements for mitigation of the exposure;
- The purpose, proper selection, use, and limitations of respirators;
- The purposes and description of the medical surveillance program, including the adverse effects of excessive chemical exposure; and
- The engineering controls and work practices associated with the project.

4.2 Physical Hazards

4.2.1 Fire Hazards

During all on-site activities, the following practices will be used for fire prevention and protection:

- Smoking is prohibited;
- Accumulations of combustible scrap and debris will be promptly removed and properly disposal of;
- Care will be taken with all equipment to eliminate the possibility of sparks or open flames;
- Fire fighting extinguishers will be available at all project sites, conspicuously located, readily accessible, and maintained in operational order;
- Fire extinguishers will be inspected monthly; and
- Defective fire fighting equipment will be replaced immediately.

4.2.2 Heat Stress

Heat stress is a hazard during warm weather or when personnel are wearing PPE, which aggravate the heat stress hazard. Heat stress can occur even when temperatures are moderate if

the body's physiological processes fail to maintain a normal body temperature. The resulting physical reactions that occur are fatigue; irritability; anxiety; and a decrease in concentration, dexterity, and/or movement. Onset of signs and symptoms of exposure can occur rapidly, and may progress to a medical emergency (i.e. heat stroke) without early intervention. In extreme cases, death can result if the patient is not given immediate treatment.

To control exposure to heat stress, monitoring will commence when personnel are required to wear PPE, including Tyvek-type coveralls, in ambient conditions exceeding 70°F, or when wearing standard work uniforms (Level D) in ambient conditions exceeding 85°F. The following safety procedures will be implemented:

- All employees will be monitored for heat stress using the buddy system;
- Potable drinking water will be available at all times;
- Frequent rest breaks will be taken;
- Shade (i.e. fixed or portable canopy) will be available;
- Employees shall be encouraged to eat a normal diet and refrain from consuming diuretics, including caffeinated coffee and tea beverages, or any form of alcohol; and
- The signs and symptoms of heat stress will be the subject of a safety and health tailgate meeting. Appendix C presents the signs, symptoms, and care for Heat Stress emergencies.

4.2.3 Cold Stress

Persons working outdoors in temperatures at or below freezing and/or in low wind chill conditions may suffer from cold exposure. During prolonged outdoor periods with inadequate clothing, effects of cold exposure may even occur at temperatures above freezing. Cold related emergencies can be the result of local (frostbite) or general (hypothermia) cooling of the body. Areas most commonly affected by frostbite are the ears, nose, hands, and feet. Lack of proper treatment can result in permanent damage to the affected body part. Hypothermia occurs when the body is unable to maintain its proper core (internal) temperature. If the patient's condition is allowed to deteriorate, hypothermia will lead to death.

Warm shelter will be available at all times, warm clothing will be worn, and work schedules will reflect the need to rest away from the cold temperatures. Warm drinks (no alcohol) will also be available on-site. The "buddy system" will be implemented. If cold conditions exist, the signs and symptoms of cold stress will be the subject of a safety and health tailgate meeting. Appendix C presents the signs, symptoms, and care for Cold Stress emergencies.

4.2.4 Noise

The potential for noise exposure during field operations is related to individual equipment operations and any adjacent vehicle noise. Noise hazard during excavation, transporting of soil, and other heavy equipment operations will be periodically monitored by the SSHO using a Type 2 sound level meter. Hearing protective devices will be worn for any extended operations exceeding 85 dBA (weighted scale) and/or at the direction of the SSHO.

4.2.5 Safety Hazards - Heavy Equipment Operations

All personnel on-site must be made aware of the hazards of working with and around heavy equipment. Visibility problems create the largest hazard for the operator. Never park behind a piece of heavy equipment and always give the right of way to the equipment. When in the vicinity of equipment operations be sure to make the operator aware of your presence.

Physical hazards during mobilization and demobilization can arise from various site activities, including off-loading heavy equipment from tractor-trailers and locating equipment to designated areas. Hazards will be mitigated by using caution around moving equipment and by avoiding close proximity to moving equipment whenever possible. Field personnel may be exposed to a variety of physical injury hazards associated with equipment operations including noise, struck-by injuries, eye hazards, and hand and foot injuries. ECC will operate all heavy equipment operations in accordance with 29 CFR 1926. The primary equipment to be operated during this project include a loader, two dump trucks, a water truck, a backhoe, and a grader. The following measures will be implemented for equipment operations to mitigate these hazards:

- The required work uniform for all field personnel (i.e. Level D protection) will be general work clothes, steel-toed construction boots (ANSI approved), safety goggles or glasses, work gloves, high visibility vests, and a hard hat (ANSI approved);
- Good housekeeping and adequate work space will be established before operation of any equipment, and will be maintained for the duration of the operation;
- Equipment will be inspected daily for condition and operation prior to use;
- Field personnel will only approach operating equipment from the operators angle of view, after making eye contact; and
- Only trained, qualified persons will be assigned to operate individual equipment.

Operator Requirements

Mobile mechanized equipment will be operated only by qualified personnel. Operators will receive the instructions and training and attend all safety meetings and job hazard analysis discussions. Operators will not be permitted to work if their ability or alertness is impaired by

drugs, fatigue, illness, intoxication, or any conditions that expose themselves or others to injury. Operators of mechanized equipment will meet the licensing requirements of the DOT for on-highway operations. Shift periods for personnel will be limited to 12 hours in a 24-hour period.

Maintenance Requirements

The following heavy equipment maintenance requirements will be observed:

- Equipment will be removed from service and repaired before returning to service whenever an unsafe condition is detected;
- Equipment will be shutdown while repairs or adjustments are being performed unless operation is essential to the repair;
- Equipment will be shutdown, with brakes set and wheels chocked, while being refueled;
- Tire repair will be performed in a safe manner;
- Suspended equipment or parts will be blocked or lowered to a supporting surface before personnel work in, under, or between them; and
- Asbestos-lined brake assemblies will be cleaned using a vacuum with a high-efficiency particulate airfilter (HEPA).

4.2.6 Safety Hazards - Vehicle Traffic

Employees will be exposed to vehicle accident hazards during the project. To control these hazards, the following safety requirements will be strictly enforced.

- Seat belts will be worn ANYTIME a vehicle is in motion, regardless of speed or distance to be traveled. Seat belt requirements also apply to the operation of construction equipment; and
- Basic speed laws will be followed at all times. Vehicles will not be operated at speeds unsafe for the conditions (i.e. road surface, traffic, visibility, weather, etc.).
- Traffic controls (Flaggers, Signs, Etc.) will be put in place for each location that impacts city streets or thoroughfares.

4.2.7 Safety Hazards - Open Excavation Hazards

Field personnel may be exposed to several hazards associated with excavation activities. A primary initial hazard with excavation operations is contact with underground utilities including electrical, gas, water/sewer, and chemical pipeline. To mitigate these hazards, the Site Supervisor will take the following actions:

- Verify the exact location of each authorized excavation with the OSC, and/or on-site officials prior to breaking ground;
- Make every attempt to determine the presence or absence of any underground utilities in the region by contacting Underground Service Alert, the OSC, and/or local utility services;
- Hand dig the first two to three feet of the excavation in areas where contact with utilities is questionable; and
- Arrange for the deactivation of utilities whenever possible and appropriate for the circumstances.

An additional primary excavation hazard is exposure to the open, excavated area, resulting in falls. The excavation depth will average 6 inches; however, the possibility of deeper excavations for ditches does exist. Should the construction of ditches be required, they will be constructed so that the slopes will always be stable and no human entry will be permitted. Slopes will be cut to 1½ horizontal to 1 vertical to stabilize these slopes. To mitigate the hazard of falling, the following safety actions will be taken:

- Clearly mark and secure excavated areas with barricades and caution tapes to prevent unauthorized and/or accidental entry into work areas; and
- Direct necessary foot and vehicle traffic around the excavation work areas, with the routes clearly marked.

Inspections

Daily inspections will be made of the sites, including the excavations, monitoring systems, and the adjacent areas, by the RM or his representative to check for unstable areas, protective system failure, and other hazardous conditions. The inspection will be conducted prior to the commencement of work and periodically throughout the shift, as needed. Inspections will be made after each rainstorm or other hazard-increasing occurrence.

4.2.8 Respirable Dusts and Particulates (Action Levels)

Contact with respirable dusts and particulates contaminated with heavy metal deposits may be anticipated on this site. Dust control measures such as wetting down dusty areas and the use of proper respiratory protective equipment will be imperative to control and minimize exposure.

Proper PPE will be worn by all workers to eliminate the possibility of inhalation of respirable dusts containing these hazards if airborne dust exposure levels exceed 30 micrograms per cubic meter (or 0.03 mg/m^3 -the OSHA Lead Standard [29 CFR 1910.1025(b)] action level for Lead). (Note: This action level may be modified after baseline exposure monitoring results are received and interpreted.)

If this level is reached, dust suppression efforts will be increased immediately. If dust suppression efforts are not successful, work will be halted until the situation is brought under control. Because this is a residential clean-up, excessive dust levels will not be allowed. As soon as visible dust is noticed, dust control measures will be instituted, and if not successful, work will stop.

4.2.9 Activity Hazard Analysis

An analysis of the potential physical hazards associated with project tasks and proposed control measures for the hazards is presented in Table 2, Activity Hazard Analysis.

TABLE 2
ACTIVITY HAZARD ANALYSIS

Potential Hazards	Tasks	Control Measures
Contact with lead and arsenic contaminated soil. Dermal and inhalation.	Excavation, Stockpiling	Proper PPE usage; Analysis of soil for contaminants; Proper engineering controls in place to prevent contamination; Strict enforcement of respiratory protection procedures; Proper decon procedures. Dust Abatement.
Slip, trip, and fall hazard	All planned field activities.	Awareness of physical hazards
Slip, trip, and fall of vehicles	Heavy equipment operations and automobile driving	Use vehicles equipped with heavy tread tires (snow tires, if necessary); Operate very cautiously and drive at low speeds.
Contact/pinch points with moving equipment	Soil Stockpiling; backfilling operations	Use caution around moving equipment.
Hazards associated with heavy equipment operations.	Excavation; Stockpiling; backfilling and sodding operations.	Trained equipment operators; Minimize work and personnel in vicinity of equipment; Use safety inspection checklists for heavy equipment daily.
Inhalation of dust and other respirable particulate.	Excavation; Stockpiling; backfilling operations	Utilize dust control measures such as sprinkling water to suppress dust; Monitor the dust using a miniram dust monitor; Use proper PPE and respiratory protection.
Cold Stress	Site Operations	Wear appropriate PPE; Take preventative measures for cold stress
Heat Stress	Site Operations	Monitor when using in 70° or above or Level D at 85° and above; Regular rest periods; Appropriate fluid intake.
Dermal contact with rinsate containing residual amounts of contaminants.	Decontamination of equipment	Wear appropriate PPE.

Potential Hazards	Tasks	Control Measures
General construction hazards associated with excavation and construction.: slip, trip, and fall	Excavation of contaminated soil, stockpiling, power screen operation, and capping construction.	Awareness of physical hazards; Buddy system in place; Good housekeeping practices; Daily safety inspections for hazards

4.3 Biological Hazards

Potential biological hazards that may be encountered during operation of the above tasks include snakes, insect bites/stings (including tick bites), poison ivy, and hazards associated with domestic pets. Venomous snakes may be present in the area, especially in ditches and under rocks and debris. Ticks may carry diseases, such as Rocky Mountain Spotted Fever and Lyme Disease. Deer mouse droppings may carry the Hanta Virus. Residential work may lead to encounters with dogs protecting their homes. Dogs can present both physical danger and biological danger from their bites in the form of puncture wounds and resulting infections. Heightened awareness is the best defense against these hazards. Use the following precautions:

- Apply an insect repellent containing DEET every few hours when in insect- and spider-infested areas. Use a solid repellant to minimize potential contamination of field samples;
- Perform periodic self-examinations for the presence of ticks, especially on the scalp;
- Use gloved hands or utensils to remove questionable vegetation;
- Avoid areas with low air exchange rates;
- Use extreme care when approaching an unfamiliar dog. Do not enter fenced yards unless the owner is present and has the animal under control. Unleashed dogs should be observed with care. Warning signs include bared teeth, raised fur, ears drawn back, lowered head, stiff movements, and non- or slow, lowered-wagging tail; and
- Be aware of the surrounding area and its possible hazards.

5.0 GENERAL HEALTH AND SAFETY PROGRAM

The SSHO will implement the ECC Safety and Health Program (SHP) for the period of on-site work. A copy of SHP will be available on-site during the course of the project. The following provisions are included in the SHP:

- All ECC personnel will attend a site-specific safety training course prior to the mobilization of the project.

- The SSHO will be responsible for maintaining a clean job site free from hazards and providing safe access and egress from the site. Physical barriers delineating a work site will be utilized for traffic control and limiting access to hazardous and restricted areas.

- Emergency phone numbers will be posted in a conspicuous location for the fire department, ambulance service, and the nearest emergency medical clinic/hospital. A map and directions indicating the fastest route to the clinic/hospital will also be posted. A mobile telephone or communication system will be present on-site during field activities. The SSHO will be the lead in all emergency situations.

- A daily safety meeting will be conducted to discuss pertinent safety topics at the beginning of each shift, whenever new ECC personnel arrive at the job site, and as site conditions change. These meetings will be conducted by the SSHO.

- Continuous monitoring of the site conditions will be conducted by the SSHO.

5.1 Accident Investigations

Non-serious accidents/incidents will be reported to the ECC Field Supervisor or SSHO. The Field Supervisor or the SSHO will arrange for medical assistance. The Field Supervisor or SSHO will investigate the accident/incident. Within 3 working days, ECC will submit a completed Report of Injury Form (Appendix D) for all personal injuries and a comprehensive narrative report or property damage accidents.

Potentially serious accident/incidents will be immediately reported to the OSC. The involved equipment or work site will remain secured until ECC completes an OSC-acceptable comprehensive investigation and the OSC gives permission to resume work. ECC will submit a detailed investigation report to the OSC within five days after the investigation.

Serious accident/incidents will be immediately reported to the OSC and appropriate ECC personnel. ECC is responsible for obtaining the appropriate medical and emergency assistance; and for notifying the coroner, law enforcement agencies, and family members. Except for rescue and emergency measures, the site of the accident/incident will not be disturbed and work will not resume until it is authorized by the OSC. ECC will assist the OSC in conducting investigations of the accident/incident and will ensure the availability of all information, personnel and data pertinent to the investigation. Also, the Report of Injury Form (Appendix D) will be completed by ECC and submitted to the OSC for each injured person.

5.2 Accident Reporting

The Incident Investigation Report (Incident/Accident Reporting Form - Appendix B),will be completed in the following work-related circumstances:

- A lost-time injury results from the accident.
- Property damage in excess of $2,000.00 results from the accident.

The Incident Investigation Report will be completed the day of the injury/incident. The report will be submitted within two working days. A copy will be kept in the site files. The original will be sent to the main office and filed in the employee's personnel/training file.

5.3 Site Safety Requirements

5.3.1 Emergency Safety Equipment

The following emergency equipment will be available and stationed at each work location each day of the project:

- 15 minute portable eye/face wash meeting ANSI standards;
- 10 lbs., combination ABC or equivalent, portable fire extinguisher;
- First aid kit (physician approved);
- Air horn or other noise maker used to notify of emergency site evacuations;
- Portable mobile telephone (accessible by field personnel during an emergency);
- Potable drinking water; and
- Chemical absorbent socks (or equivalent).

All stand-by equipment will be staged in visible, easily accessible locations within the support zone at each work location. The SSHO will be responsible for staging this equipment and reviewing its location and use with field personnel during daily Tailgate Safety Meetings.

5.3.2 Housekeeping

A strict housekeeping program will be implemented daily at each work location. The purpose of the housekeeping program is to reduce or prevent accidents and to prevent the unwanted spread of contamination, debris, or other material to any areas. The SSHO and Site Supervisor will both be responsible for ensuring that good housekeeping is maintained at all times during the project.

The following housekeeping procedures apply to this project:

- Only in-use equipment and tools will be off-loaded from vehicles;
- Work areas will be continuously "policed" by field personnel and the Field Supervisor for cleanliness and orderliness;
- All spills will be immediately cleaned up;
- Loose dirt and debris will be immediately cleaned up;
- No dirt or loose debris will be left in any work area, or allowed to leave any work area either by vehicle, foot, or wind movement; and
- In windy conditions, excavated soils will be lightly wetted with a water fog to reduce airborne dust. No water run-off will be generated or allowed.

Smoking, eating, drinking, applying cosmetics or chopstick, or chewing tobacco while in the EZ or CRZs, or any potentially contaminated area is forbidden.

5.3.3 Sanitation

The SSHO will ensure that adequate drinking water, toilet facilities, and hand washing facilities are available daily to all field personnel. For drinking water, at least one gallon per person will be provided daily. Potable water will be supplied from a pressurized source (i.e. tap water) or commercially available bottled water. Disposable drinking cups will be provided at each work location, and will be stored and made available in a sanitary manner. Any non-potable sources of water will be clearly marked.

Toilet facilities will be immediately available at all times to field personnel (i.e. on-site or immediately adjacent rest room facilities or on-site portable chemical toilets). Toilet facilities will be reasonably accessible for field personnel (i.e. within five minutes).

Hand washing facilities will be adjacent to the decontamination station at each work location. Hand washing facilities will consist of soap, clean water, wash basins, and single-use towels. Collected waste water will be disposed of properly.

5.3.4 Buddy System

A buddy system, consisting of a minimum of two persons, will be used during the performance of site activities for the project. The buddy system requires field personnel to:

- Provide his or her partner with assistance;
- Observe his or her partner for signs of chemical or heat exposure;
- Periodically check the integrity of his or her partner's protective clothing; and
- Notify the RM or others if emergency help is needed.

For efficiency and safety, a minimum number of personnel will be present in the EZ.

5.3.5 Hazard Assessment (Chemical, Physical and Explosive)

Each on-site employee needs to be aware of their surroundings and the chemical/physical hazards present. During excavation and backfilling operations, site personnel should be aware of the following safety hazards:

- All site conditions, including in-place utilities;
- Wind direction;
- Terrain homogeneity; and
- Trip hazards.

6.0 TRAINING

All field personnel, including skilled support workers (such as equipment operators, truck drivers, laborers, etc...) and subcontractor personnel, assigned to this project will have satisfied the training requirements of the contractor's written safety and health training program, 29 CFR 1910.120 (e), 29 CFR 1926.65 and 29 CFR 1926.21, including:

- OSHA 40-Hour Hazardous Waste Operations Training with a minimum of 3 days of supervised hazardous waste work, all personnel;
- OSHA 8-Hour Refresher Training, all personnel who completed OSHA 40-Hour training more than 12 months previously; and
- OSHA 8-Hour Supervisor Training, required for the Field Supervisor and any other field personnel assigned supervisory duties during the project.

In addition, the following training requirements will be satisfied:

- All field personnel assigned to the project will be informed of, and trained on the content and application of the SHASP, will receive a copy of the SHASP, and will sign a Site-Specific Safety and Health Plan Acknowledgment Form upon completion of this training.

All required training will be documented and ECC will maintain copies of all training certificates, medical clearance records, and record of all training forms. Copies of all certifications/training sessions will be available on-site.

6.1 Lead Hazard Training

ECC will provide an information and training program for all field personnel that may be subjected to lead exposure above the action level of 30 μg of lead per cubic meter of air per 8 hours.

6.2 Tailgate Safety Meetings

The SSHO will conduct a Tailgate Safety Meeting with all field personnel, including subcontractor personnel, at the beginning of every shift or when job conditions change. At each meeting, the Tailgate Safety Meeting form will be completed by the SSHO and signed by all attendees (Appendix E). An outline of a safety meeting is as follows:

- Site safety responsibilities;
- Medical surveillance program;
- Review of ECC's SHASP;

- Potential chemical/physical hazards;
- Personal protective equipment/respiratory protection;
- Personal/equipment decontamination;
- Emergency assistance network; and
- Discussion of Heat and Cold stress (as appropriate) - This includes symptoms of the exposure, physiological effects, body safety requirements.

All site visitors will be briefed on the field operations and the daily Tailgate Safety Meeting information prior to entering a designated EZ. A Tailgate Safety Meeting form will be filled out each day to document those attending and what was discussed during the meetings. Tailgate Safety Meeting records will be available to all field personnel and site visitors during working hours. These records will be maintained on-site during the project and will be provided to the OSC upon request.

6.3 Hazard Communication

ECC maintains a Hazard Communication program for its employees. All field personnel assigned to the project will receive Hazard Communication training prior to the start of this project (i.e. included in OSHA 40-Hour Hazardous Waste Operations Training). A copy of Hazard Communication Program will be on file at the site. ECC will provide MSDSs representing the chemical substances being remediated during the project. If a change in the scope of work requires the use of hazardous materials, ECC will provide and maintain copies of applicable MSDSs on-site.

6.4 Respiratory Protection Program

ECC provides a Respiratory Protection Program for its employees. This program includes written procedures, training, medical surveillance, fit testing, maintenance of equipment and other components. All field personnel assigned to this project will be covered under this program (or an equivalent program for subcontractor personnel). All ECC employees will be fit tested and trained in the use of Air Purifying Respirators (APR) prior to changing to Level C PPE. This project will not require the use of supplied air respirators. The ECC Respiratory Program is available for review from the Safety and Health Manager.

6.5 Safety Inspections

The SSHO will perform daily safety inspections at the work site. The daily safety inspections will be documented in detail and available for review by the OSC. The Safety Inspection results as presented in the Response Manager's Daily Log.

7.0 PERSONAL PROTECTIVE EQUIPMENT PROGRAM

Personal protective clothing and equipment is on hand for use in an emergency situation. The purpose of personal protective equipment and clothing is to isolate individuals from chemical and physical hazards. Level of protection will be selected or deemed necessary by the RM or SSHO. Level of protection at any site will be selected on a site specific/task specific basis; however, Level D will be worn as minimum for all site activities. Level C will be used when total airborne dust concentrations exceed 0.050 mg/m^3, or at any time directed by the SSHO. The equipment list given below includes information on all levels of protection.

7.1 Levels of Protection

7.1.1 OSHA Modified Level D

Level D is the basic work uniform that will be used.

- Insulated Coveralls (Optional) - These coveralls will be oversized to allow several layers of wool or pile or polypropylene clothing inside, if necessary;
- Disposable Overalls (Tyvek and Saranex, Optional);
- Boots - chemical resistant, steel toe, and shank (ANSI Z41-1983, Safety Toe Footwear, Classification 75);
- Gloves;
- Safety glasses or goggles to guard against dust, grit, wind, etc.;
- Hard hat (ANSI Z89.1-1986, Class A, B, and C);
- Hearing protection; and
- Red or orange vest.

7.1.2 OSHA Level C

Level C will be selected when the type of airborne substance is known, concentration measured, criteria for using air purifying respiratory protection met, and skin and eye exposure is unlikely. Periodic dust monitoring will be performed. Note that all the requirements for hard hat, coveralls, and boots apply to this level.

- Half-face/full-face air purifying respirator with HEPA/organic vapor cartridge: Air monitoring will be performed continuously with dust monitor miniram. If the concentrations are above 0.05 mg/m^3, a half-face respirator will be used. A full-face respirator will be used if the concentrations are above 0.10 mg/m^3;
- Tyvek/Saranex coveralls - Refer to Modified Level D;
- Neoprene outer gloves - Refer to Modified Level D;
- Cotton inner gloves - Refer to Modified Level D;
- Hard hat with face shield - Refer to Modified Level D;

- Steel toed rubber boots - Refer to Modified Level D;
- Rubber boot covers (where applicable);
- Taped wrist and ankle joints;
- Chemical goggles (where applicable);
- Hearing protection (where applicable);
- Safety glasses; and
- Red or Orange vest.

Protective clothing material must be compatible with the identified hazardous substances released. In an unknown situation, the material providing the highest overall protection will be utilized.

No individual will enter an area where respiratory protective equipment is required unless the person is trained in the selection, use, care and limitations of the respirator, and the proper respirator is selected for the task. Whenever respirators are required, only equipment approved for that purpose will be used. This equipment must be approved by NIOSH. Only parts approved for the specific respirator system are to be used for replacement. Only a person specifically trained will perform work with respirators. Proper selection of respirators will be made according to guidance provided by ANSI standard Z88.2 -1980. The correct respirator will be specified for each job.

7.2 Project PPE Requirements

All personnel working in North Denver Soils Site related work areas will wear Level D PPE unless the CIH, the SSHO, and the OSC decide that Level C is more appropriate. Air purifying respirators (APR) will be available on-site, if action levels require a change to Level C PPE.

7.3 PPE Inspection Program

Regular inspection of PPE, together with respiratory protective equipment will be performed. ECC's SSHO will ensure the following during PPE inspection:

- All equipment will be inspected by the wearer prior to use;
- Respirator cartridges will be disposed of daily (i.e. not reused);
- Respirator cartridges will be changed during a work shift if the wearer experiences breakthrough, resistance, or uncomfortably warm inhaled air, or if the respirator/cartridges become wet or grossly contaminated;
- Disposable protective items may be reused during a work shift provided they are not damaged or obviously contaminated. Disposable items will be disposed of daily; and
- Reusable protective items will be cleaned and inspected daily.

7.4 Care of Equipment

Properly specified and donned PPE offers a high degree of protection, yet the equipment must be maintained and inspected on a regular basis. The following guidelines will be followed to ensure proper PPE handling.

Gloves and full body coveralls - Gloves and full body coveralls will be inspected and replaced promptly if a tear develops.

Respirators - Respirators will be inspected and leak-checked each time they are donned. Respirator cartridges will be replaced daily, or more frequently if excessive resistance or breakthrough develops. All respiratory maintenance will be performed by a trained technician. Respirators will be cleaned daily. Each individual will be assigned exclusive use of a respirator. Each respirator will be stored in a plastic storage box labeled with the user's name.

7.5 Equipment Selection

The SSHO will be in charge of equipment selection and inventory. The level of protection may be upgraded or downgraded by the SSHO as conditions change at the site.

Reasons to upgrade include:

- Change in work task that will increase contact or potential contact with hazardous materials;
- Action level is detected during monitoring; and
- Request of the individual employee.

Reasons to downgrade include:

- New information indicating the situation is less hazardous than originally believed;
- Change in site conditions that decreases the hazards; and
- Monitoring or lab analysis support a decision to downgrade.

7.6 Air Purifying Respirators Selection

Modified Level D (APR) or Level C protection will be worn when total airborne dust levels exceed 0.030 mg/m^3. Modified Level D or Level C protection will include the use of NIOSH approved half-face APRs equipped with a HEPA prefilters. HEPA prefilters are effective for

lead concentrations less than 2,5000 mg/m^3. (Note: Modified Level D protection may be worn at total airborne dust levels less then 0.030 mg/m^3 if directed by the SSHO or the CIH).

8.0 MEDICAL SURVEILLANCE

All ECC employees have received an extensive pre-employment medical screening in accordance with OSHA standards. Personnel also receive periodic and follow-up examinations when appropriate. All medical monitoring information is properly documented and is maintained in each employees' personnel file.

The medical surveillance program is established to ensure that personnel are capable of performing their assigned activities and to ensure that the health of employees is not compromised by potential exposure to chemical or physical agents found at work sites. This program is designed to support and monitor the effectiveness of the primary Health and Safety goal of controlling worker exposure to hazardous materials.

The medical surveillance program is required for employees who are or may be:

- Exposed to substances above permissible levels;
- Required to wear a respirator; and/or
- Exposed above permissible levels in accidents or emergency situations.

In accordance with these requirements, employees who have a potential site exposure risk, who work with potentially hazardous materials, or who are required to wear respiratory devices, and whose duties require them to enter EZ or CRZs will participate in the medical surveillance program. Employees who are required to be monitored under other regulations (e.g., DOT drivers) will also participate.

8.1 Project Medical Surveillance

All personnel involved in this project will be provided with medical examinations prior to participation in on-site operations and at 12 month intervals during the progress of the operations. The medical exam will be repeated if necessitated by substandard performance or evidence of particular stress or chemical exposure. A medical exam will also be repeated if employment is terminated for an individual before completion of the contract.

Managers will provide the examining physician:

- A copy of the OSHA regulation relating to hazardous waste site workers and its appendices (29 CFR 1910.120);
- Description of employees' duties as they relate to exposures;
- Description of the personal protective equipment to be used;
- Information from previous examinations which may not be readily available to the physician; and

- A copy of the ECC Medical Program.

Documentation of employee participation in the medical surveillance program and physician determination that the employees have the ability to participate in field activities, with its PPE and respirator requirements, will be attached to the field copy of the SHASP.

A follow-up medical exam will be given to any individual who received a chemical exposure above the Permissible Exposure Limit (PEL).

8.2 Verification of Knowledge and Procedures at Site

ECC employees will be informed of the degree and nature of any potential safety and health hazards specific to the complex prior to any on-site response activities. Safety meetings will be held before each shift and when a new activity is started. All attendees will sign the attendance list.

9.0 EXPOSURE MONITORING PROGRAM

Based on the chemical and physical hazards anticipated to be encountered during this project, appropriate exposure monitoring will be conducted to identify and evaluate hazards and guide field decisions related to personnel safety and operations. Monitoring will be used for collecting information on the following:

- Selecting PPE (downgrading or upgrading);
- Delineating areas where protection is needed;
- Assessing the potential health effects of exposure; and
- Determining the need for specific medical monitoring.

9.1 Minimum Requirements

Air monitoring and sampling will be performed by the SSHO at the start-up of work to confirm PPE requirements and establish a baseline of exposure information.

The ECC SSHO will be trained and qualified to operate all instruments, including inspection, calibration check, warm-up and functions check, sampling procedures, maintenance, and storage.

All field portable monitoring instruments will be calibrated according to the manufacturer's instructions daily. A record of this calibration will be maintained by ECC on-site during the project. This daily instrument calibration will be performed by the SSHO and documented on an Instrument Calibration Log. Records of the daily calibration checks will be maintained on-site during the project.

9.2 Project Exposure Monitoring

9.2.1 Personal Particulate Monitoring

All personnel in the residential work areas will wear Level D PPE. In accordance with the requirements of 29 CFR 1926.62, individuals with the greatest exposure to airborne concentrations of lead will wear personal air sampling units for a 10-hour work shift during the initial excavation activities of new tasks. These full shift personal samples will be representative of the monitored individual's regular, daily exposure to lead. Personal air samplers will be calibrated prior to each sampling event by the ECC SSHO. At the close of the sampled shift, the SSHO will collect the sample cassettes, record the duration of the sampling event, and prepare the cassettes for shipment. The sample cassettes will be sent to a qualified lab each day where the concentration of lead exposure will be calculated based on the air volume sampled and the sampling duration as reported on the chain-of-custody form by the SSHO. Any recommended changes to the level of PPE will be reviewed with the CIH, the SSHO, and the OSC.

In the event that employee exposure exceeds the PEL, full-face respirators must be worn unless dust abatement measures are instituted that decrease the exposure to a level below the PEL. Upon commencement of the work, exclusion zone monitoring will be performed by the SSHO to determine the effectiveness of the dust control procedures.

9.2.2 Total Particulate Monitoring

A MIE mini-ram particulate monitor will be used to measure dust by the SSHO. Results will be recorded in the Exposure Monitoring Log (Appendix F). Total airborne dust exposure levels exceeding 0.030 mg/m^3 will prompt the use of Level C protection. However, as stated in Section 2.4, visible dust emissions will not be permitted. Dust control measures will be instituted with the commencement of work. During the operations, water spraying will be used as a dust abatement measure to preclude the spread of dust. Periodically, total particulate monitoring of employees' breathing zones will be performed by the ECC SSHO using the MIE mini-ram particulate monitor.

9.2.3 Perimeter Air Monitoring

Perimeter air monitoring will be conducted by the START Contractor. In order to characterize the existing dust levels prior to any construction disturbance, upwind particulate monitoring will be performed initially. If the upwind monitoring indicates an appreciable background dust level, then the upwind monitoring should be continued to verify ECC's compliance with the dust abatement requirement. If upwind monitoring indicates zero baseline levels, then it will be discontinued.

9.2.4 Noise

All field personnel will be required to wear hearing protective devices having a Noise Reduction Rating (NRR) of 28 or greater in active traffic areas, when using equipment capable of high noise generation, and when the sound level reading for the operation exceeds 85 dBA at a worker's location. Noise monitoring will periodically performed by the SSHO using an ANSI Type II Sound Level Meter operated in the slow mode on a weighted scale. In addition, hearing protective devices will be worn anytime the SSHO believes a potential noise hazard exists.

10.0 STANDARD OPERATING SAFETY PROCEDURES

The field safety requirements and procedures applicable to this project include site control and decontamination, sanitation, safety meetings, accident reporting and investigations, safety inspections, housekeeping, and related items.

10.1 Site Control

Site control procedures for this project will include the establishment of exclusion zones at each work location and providing site security to warn of unauthorized access and to secure work locations between shifts. The site control zones will be defined by the SSHO/ in consultation with the RM.

An EZ, clearly marked by a combination of traffic cones, barricades, and/or high visibility barrier tape, will be established around the immediate work area. The EZ marks each excavation work area where field personnel may be exposed to chemical and physical hazards. The size and shape of the EZ will be based on known and anticipated hazards, type of operation being performed, and physical and topographical features, etc. Site control requirements will be reviewed during daily Tailgate Safety Meetings.

At the end of each work day, any open excavations greater than 6 inches in depth will be barricaded in ALL directions with lighted barricades. All barricades will be connected by a double run of barrier tape.

10.2 Entry-Exit Procedures

Entry into the EZ will be regulated by the RM and the SSHO. Visitors entering the site must be cleared for access.

10.3 Safe Work Practices

The following safe work practices will apply to this project:

- Eating, drinking, use of gum or tobacco products, or the applying of cosmetics will only be allowed outside the EZ;
- Smoking and any other sources of ignition will be prohibited within 50 feet of any work area and sources of flammable/combustible chemicals;
- Personnel will wash their hands, face, and any exposed skin after leaving the EZ;
- Personnel will participate in Tailgate Safety Meetings;

- Personnel will continually observe their work location and be alert to changes in the environment that may affect safety;
- Personnel will only enter and exit regulated work areas when instructed by the Site Supervisor, and will only enter through designated control points;
- Personnel will report any accident, near miss, or unusual situations to the SSHO and/or the Site Supervisor immediately;
- Personnel will use the PPE provided as instructed by the SSHO or the Site Supervisor;
- Personnel will avoid hand-to-mouth or hand-to-face activities;
- All instruments and safety equipment will be inspected prior to use;
- All vehicles and construction equipment will be inspected prior to use;
- An ABC fire extinguisher will be mounted on all construction vehicles and equipment used on-site;
- The buddy system will be used for all personnel entering the EZ;
- Personnel working together will continually be aware of their partner, and will make integrity checks of their partner;
- Personnel will work purposefully and as a team;
- Personnel will avoid rushing and/or taking short cuts;
- Personnel will work within their own physical and mental limits;
- Personnel will take adequate rest breaks and replace body fluids (water and electrolytes) continuously;
- Personnel will follow the instructions of the Site Supervisor at all times;
- Personnel will not deviate from the SHASP or the instructions of the Site Supervisor; and
- All waste generated during the removal activities will be handled and disposed of as per the contract requirements. No waste will be disposed of without the direction of the Site Supervisor.

11.0 DECONTAMINATION PROCEDURES

Decontamination will be required of personnel, equipment, instrumentation, or heavy equipment prior to exit from the EZ. The decontamination facilities will be located in the CRZ. The decontamination area will be clearly defined and equipped with all necessary equipment. Decontamination of personnel and/or equipment will be done in accordance to requirements stated in 29 CFR 1910.120, 29 CFR 1926.62 (I), and other applicable local, State, or Federal requirements.

11.1 Personnel and Small Equipment Decontamination Procedures

Decontamination will be required of personnel prior to exit from the EZ.

For Level D:

- Move to the designated decontamination area;
- Clean work boots of any accumulation of soil or mud;
- Remove leather work gloves; and
- Wash hands and face.

For Modified Level D or Level C:

- Move to the designated decontamination area;
- Wash gloves, boots and any taped areas;
- Remove tape;
- Remove outer gloves;
- Remove suit from the inside out;
- Remove respirator facepiece;
- Remove inner gloves;
- Wash hands, face, and any exposed skin; and
- Protective clothing will be stored in a manner to avoid potential contamination of inner surfaces.

Personnel assigned to the decontamination process will assist the field personnel during the personnel decontamination procedures including decontamination of the small equipment and reusable protective gear.

11.1.1 Temporary Exit

Temporary exit from the immediate work area for breaks, lunches, etc. will require procedures which vary according to the level of PPE required.

- Follow decontamination procedure appropriate to the level of protection (i.e., Level C or D) as listed in Section 11.1;
- Rinse gloves with soap and water to remove excess contamination;
- Gloves, protective suits, and booties will be removed as appropriate;
- Hands and face will be thoroughly washed; and
- Protective clothing will be stored in a manner to avoid potential contamination of inner surfaces.

11.1.2 Exit from Site

Exit from the site requires procedures as described below:

- Follow decontamination procedure appropriate to the level of protection (i.e., Level C or D) as listed in Section 11.1;
- All suits, gloves, and booties used during the day must be removed at the end of the day's work or prior to leaving the site
- Containerize used protective clothing for disposal; and
- Wash hands, face, and any exposed skin. Employees are encouraged to wash their entire body thoroughly at their earliest opportunity.

In an emergency situation, in which personnel need to be transported off-site for medical attention, the employee will be decontaminated before leaving the site. If lifesaving care must be given immediately, decontamination will not be considered. Instead, the victim will be wrapped in blankets to reduce the potential for contamination of emergency care providers. Emergency care providers will be given instructions regarding decontamination procedures by the SSHO. The SSHO will accompany the patient to the hospital.

11.2 Disposal of Decontamination Materials

Materials (i.e. liquid rinsate, sludge, and disposable PPE) resulting from decontamination activities will be containerized for disposal with other contaminated waste materials at a designated area on-site.

11.3 Heavy Equipment Decontamination Procedures

All vehicles (including trucks, heavy equipment, etc.) entering the various EZs will remain in the area for the duration of the project. These vehicles will be decontaminated prior to departure from that property. The decontamination methods will conform to requirements stated in 29 CFR 1910.120 and other applicable local, State, and Federal regulations. Equipment will not be removed from the CRZ until inspected and determined "clean" by an authorized inspector. Haul trucks will not enter the EZs and; therefore, will not require decontamination.

Heavy equipment from the EZs will be thoroughly dry brushed to remove the majority of soil adhering to the vehicle. Then the equipment will be washed to the extent that visible soil is removed from the vehicle body and undercarriage and no visible soil is tracked onto roadways. No equipment will leave the CRZ until cleared by an authorized inspector. The heavy equipment decontamination will consist of the following steps:

- The equipment will be brought to the decontamination area;
- Vehicles will be decontaminated starting at the uppermost surface, working downward, and finishing with the underside;
- Accumulated material will be scraped off using a shovel or other long-handled instrument;
- Remaining material will be swept off using a broom and/or long-handled brush, as long as no airborne dust is produced;
- Dry material will be disposed of in a disposal area designated upon mobilization;
- The engine compartment, cab, and tool boxes will be sealed during decontamination of the vehicle exterior surfaces;
- Using a water washer, the affected areas will be manually cleaned;
- After scrubbing, the vehicle will be thoroughly rinsed with water until all visible material is removed; and
- Wastewater will be contained, consolidated, and disposed of at the soils stockpile area.

12.0 SPILL AND DISCHARGE CONTROL

ECC will provide contingency measures for potential spills and discharge from trucks handling off-site transportation and any other potentially hazardous materials on-site. If a spill or release of a hazardous material occurs, ECC will implement the following:

- Notify the National Response Center (NRC) at 1-800-424-8802, if the spill is greater than reportable quantity (RQ) according to 40 CFR 302;
- Notify the local Fire Department;
- Provide methods and facilities to prevent contamination of soil, water, air, structures, equipment, and/or material from a release due to ECC's operations;
- Provide equipment and personnel to perform emergency measures to mitigate spills and control their spreading;
- Dispose of contaminated materials; and
- Provide a decontamination program to clean previously uncontaminated areas.

12.1 Equipment Required

ECC will have the following equipment on-site at all times in order to handle hazardous material releases:

- Noncombustible absorbent, clay desiccant or floor dry;
- DOT approved containers for temporary storage of spilled or leaking;
- Shovels and other hand tools; and
- Rubber gloves, goggles, caution tape, sheeting, etc.

12.2 Contingency Plan

The following procedures will be met during a spill response action:

- Notify the RM, SSHO, and the OSC immediately;
- Take immediate measures to control and contain the spill using the above listed equipment and materials;
- Isolate and contain hazardous spill areas;
- Deny entry to unauthorized personnel;
- Do not allow anyone to touch spilled material;
- Stay upwind;
- Keep out of low areas;
- Keep combustibles away from the spilled material;
- Use water spray to reduce vapors and dust, as needed;

- Perform clean up activities as directed by OSC, using certified personnel;
- Take samples for analysis to determine that cleanup is adequate;
- If released from tanks, prevent discharge beyond site boundaries; and
- Any other actions as needed.

12.3 Notification of Spills and Discharges

ECC will make all spill notifications under state, federal, and local regulations (including 40 CFR 110, 302, 355, 370, 372, etc.) immediately upon discovery, unless the OSC decides to take responsibility for the notification. Within one hour of notification to the regulatory authorities, ECC will verbally notify the OSC present on-site, if that individual is not already aware of the situation. A report, submitted no later than 24 hours after a release, will include the following items:

- Description of material spilled, including identity, quantity, and a copy of the waste disposal manifest;
- Exact time and location of the spill, and the description of the area involved;
- Containment procedures utilized;
- Description of the cleanup procedures employed at the site, including disposal of spill residue;
- Summary of the communications ECC has with other agencies;
- Determination if the spill is reported to the EPA and/or reportable; and
- The date the report to the appropriate agency was made and the name of the agency representative who accepted the report.

13.0 LOGS, REPORTS, AND RECORDKEEPING

13.1 Exposure of Personnel

All injuries and accidents will be reported promptly to the SSHO. Reportable incidents include, but are not limited to:

- Injuries to personnel resulting in lost time;
- Tool or equipment failure which results or could result in serious injury;
- Fire or explosion of any magnitude;
- Exposure of unprotected personnel to toxic agents;
- Vehicle accidents;
- Any injuries to authorized visitors; and
- Any damage to private property.

All injuries/illnesses, no matter how minor they appear, are to be reported to the RM, SSHO, and OSC. The incident will be logged and properly reported.

Under no circumstances will an injured employee drive himself/herself to the hospital, clinic, etc. An employee with minor injury may be transported by car after first aid treatment is given. The employee who transports the injured person will be trained in first aid and CPR whenever possible. When the injury is severe, or when in doubt concerning the severity of injury, the employee will be transported by ambulance. The employee will be accompanied to the hospital by a member of the staff personnel (i.e., the RM or the SSHO).

Injured employees that require medical treatment or are taken to a doctor, hospital, clinic, etc., will not be allowed to resume work without a written return to work statement from the treating physician. This statement should supply a medical diagnosis of the problem, the date of return to work, and work limitations. Should a statement such as "light duty" be given, call the treating physician to determine the exact restriction that is needed. Be sure the treating physician understands the type of work the employee normally performs and that alternate work is available to meet work restrictions.

13.2 OSHA 200 Log

The OSHA 200 Log is to be kept at the job site. All injuries, no matter how minor they appear, are to be logged as required by OSHA. This provides a record per exposure limits and audits safety. Minor injuries such as small cuts, scrapes, small first degree burns, and splinters that require first aid treatment, are entered on this log only. Any incident that requires the completion of the Incident Investigation Report as described below will also be logged. Maintaining this log

will meet OSHA record keeping requirements by responding to minor incidents before they become major. The original log should be retained in site records.

13.3 OSHA Records

The following records will be archived in ECC's permanent project files:

- Occupational Injuries and Illnesses - 5 years;
- Training (Hazardous Waste and Operations) - Current;
- Exposure Measurements (Hazardous Waste and Operations) - 30 years; and
- Medical Surveillance (Hazardous Waste) - 30 years.

13.4 Medical Record Requirements

The following first aid/CPR treatment and medical records will be maintained:

- Daily first aid treatment logs;
- Cumulative individual injury records;
- Monthly statistical records of occupational injuries classified as to type and nature of injury; and
- Required workman's compensation records.

13.5 Daily Log and Inspection Report

The following information will be included in the Daily Logs and Inspection Reports:

- Specific work area;
- Number of employees in each area;
- Equipment being used in each area;
- First aid treatments;
- Special health and safety issue notes;
- Daily tailgate safety meeting forms; and
- SSHO signature and date.

13.6 Weekly Report

The Weekly Report will contain the following items:

- Summary sheet covering range of work accomplished during the week;
- Daily health and safety inspection report copies;
- Instances of job-related injuries and illnesses;
- Copies of correspondence;
- Results of personal/air monitoring and screening performed; and
- SSHO signature and date.

13.7 Closure Report

The Closure Report will include:

- A summary of the project;
- Summary of health and safety activities reported throughout the duration of the project;
- Records of all occupational illnesses and injuries associated with the project;
- Copies of the final physical and medical records and the physician's final written opinion;
- Copies of the air monitoring field log;
- Copies of all air monitoring calibration records;
- Date and location; and
- Copies of all raw data collection sheets used during air monitoring activities.

14.0 EMERGENCY RESPONSE AND CONTINGENCY

A pre-emergency planning meeting will be conducted before site operations begin. Emergency conditions that may be anticipated during work activities include:

- Fire involving combustible materials;
- Medical emergency due to heat stress, cold stress, physical accident, and/or exposure to toxic materials; and
- Release of hazardous materials.

In the event of a release of hazardous materials during transport and disposal procedures, ECC's RM will be the response manager and will determine the appropriate level of response. Refer to Section 11.0 for spill and discharge control procedures.

14.1 Emergency Supplies

At a minimum, the following supplies must be immediately available for emergency on-site use:

- Portable mobile telephone (accessible by field personnel during an emergency);
- Potable drinking water
- First aid equipment and supplies
- 15 minute portable eye/face wash meeting ANSI standards;
- 10 lb. portable fire extinguishers (4 on-site);
- Air horn or other noise maker used to notify of emergency site evacuations;
- Spill control material and equipment; and
- Chemical absorbent socks (or equivalent).

The portable mobile phone will be available in the RM's vehicle. Drinking water, emergency first aid equipment, emergency air horn, and a fire extinguisher will be accessible at the ECC office trailer. The other fire extinguishers will be available in each trailer, each piece of heavy equipment, and the crew pickup. The emergency eye wash, the spill control material/ equipment, and the chemical absorbent socks will be stored at the crew trailer. The locations of these emergency supplies will be routinely discussed in daily tailgate safety meetings.

14.2 Contingency Plan Execution

In the event an emergency situation should arise while performing site activities, ECC employees will follow the predesignated procedures. **All emergencies will be routed through the 911 emergency number, this includes assistance for: fires, police, first aid, and ambulance.** Be prepared to give the following information when calling the 911 Emergency Number:

- Your name;
- Description of the emergency;
- Exact location of the emergency; and
- Any other pertinent information;

Upon discovering an emergency, the following series of events will occur:

- Notification of personnel;
- Stop work activities, if necessary;
- Lower background noises; and
- Begin the following emergency procedures (order dependent on the situation):
  - Survey casualties;
  - Access ABCs (Airway, Breathing, Circulation) of each patient;
  - Request aid (911), if necessary;
  - Assess existing and potential hazards to site personnel and off-site populations;
  - Allocate resources;
  - If a Certified EMT is in attendance, help extricate and stabilize victims;
  - Bring the hazardous substance under control; and
  - Evacuate if necessary.

14.2.1 Unknown Hazardous Materials/Substances

If any suspected, unknown, or potentially hazardous vapor, liquid, or solid is found during the process of excavating material or other site activities, all work will cease in the discovery area and the SSHO will be contacted. The SSHO will notify the ECC RM, and the EPA OSC. An evaluation of the potentially hazardous material, by visual inspection and by direct reading instrumentation (i.e., organic vapor monitor), will be conducted by the SSHO and RM. The organic vapor monitoring will be performed in Level B PPE according to the requirements of the Four Agency Manual, "Guidance to Hazardous Waste Site Worker Safety".

If the material is confirmed as hazardous, the RM and SSHO will consult with the EPA OSC concerning removal of the hazard and continuing work. Work stoppage will be kept to a minimum by identifying other activities that can be productively performed while the hazard is being mitigated.

14.3 Communications

Two sets of communication systems will be established; internal communication among personnel on-site, and external communication among on-site and off-site personnel. Internal communication will be used to:

- Alert team members to an emergency;
- Maintain site control;
- Communicate changes in work during an emergency situation; and
- Pass along safety information, such as air change, amount of air time left before break, etc.

Visual signals will be used for communication during operations. Moreover, all senior staff will be equipped with cellular phones, and depending on local frequency availability, a hand-held radio network may also be established

14.4 Emergency Recognition and Prevention

Emergency recognition and prevention training will be included in the daily tailgate safety meetings. By discussing the tasks to be performed, time constraints, emergency procedures, and hazards that may be encountered, personnel will be alert to dangers and potential emergencies.

14.5 Site Evacuations

A site evacuation would be required in the event of a fuel truck spill or similar event. Safe distances from the emergency site will be determined at the time of the incident. If the emergency incident involves a hazardous waste spill or release, the following factors will be taken into consideration for the safe distance determination:

- Toxicological properties of the substance;
- Physical state of the substance;
- Quantity released;
- Rate of release;
- Method of release;
- Vapor density relative to air;
- Wind and speed direction; and
- Local topography.

On-site safety stations will be located in a Support Zone. The safety station will include first aid equipment, fire extinguisher, hand tools, air, extra mini ram, and communication system.

14.6 Decontamination and Medical Treatment

Whether or not to decontaminate the victim will be based on the type and severity of the illness or injury and the nature of the contaminant. If decontamination cannot be done, the victim will be wrapped in blankets in order to reduce the possibility of contamination to other personnel. The medical facility will be informed of the potential contamination and a site representative will accompany the victim.

14.7 Documentation and Review

After the response, ECC will prepare an Emergency Response Report. It will include such things as a chronological history of the emergency, facts, actions, personnel present, sample results (if taken), summary of injuries, and possible exposures. This report will be given to the EPA within two days of the incident and immediate verbal notification.

14.8 Emergency Information

The following pages consist of the medical emergency information page, the hospital route map, and the emergency contact list with telephone numbers on-site personnel may need if an emergency situation occurs. Both lists and the route map will be posted at the ECC site office and kept in all project vehicles.

Table 3

Medical Emergency Information

Denver General Hospital	
Address:	777 Bannock Street Denver, Colorado 80203
Emergency Medical Services:	911
Ambulance Phone Number:	911
Hospital Phone Number:	(303) 436-6000
Distance from Site:	3.4 miles
Hospital Route from Site:	See site map.

Figure 2	Date: 10-02-98
Drawn By:	File Location:
Denver, Colorado	

Hospital Route Map

Environmental Chemical Corporation

Table 4

EMERGENCY CONTACT LIST

ORGANIZATION	TELEPHONE NUMBER
Chemtrec	1-800-424-9300
Poison Control Center	1-800-522-4611
Denver General Hospital	911 or 303-436-6000
Police Department	911 or 801-568-7200
Fire Department	911 or 801-568-2930
Chemical Spills	1-800-424-8802 / 1-800-522-0206
Ambulance	911
ECC Program Manager: Bruce Wilson Office No: Pager No:	 (303) 298-7607 1-800-748-5964
ECC Response Manager: Jim Brenkendorff Project Office No: Cell Phone No: Pager No	 (801) TBD (719) 684-9396 1-800-746-3215
ECC Site Safety and Health Officer: Lloyd McKissick Office No: Cell Phone No: Pager No:	 (303) 298-7607 (219)668-0584 (800)-574-3923
ECC CIH: Bruce Lazarus	(916) 853-9400 (24 hours)
EPA OSC: Pete Stevenson	(303) 312-6799

FIGURES

Figure 1	Date: 10-02-98
Drawn By:	File Location:
Denver, Colorado	
Site Map	
Environmental Chemical Corporation	

Figure 1
Site Location Map

Figure 2
Site Map

Appendix A
Site Health and Safety Plan Compliance Agreement

ENVIRONMENTAL CHEMICAL CORPORATION
SITE HEALTH AND SAFETY PLAN
COMPLIANCE AGREEMENT

I have received a copy of the Site Specific Site Health and Safety Plan for the North Denver Soils Site Removal Actions. I have received information and training on the contents of the plan including operations to be performed, site hazards, safety requirements, use of personal protective clothing and equipment, monitoring requirements, site control, and decontamination procedures and actions to take in the event of a site emergency.

I have reviewed the plan, understand its requirements, and agree to comply with all of its provisions. I understand that failure to comply with these requirements could result in disciplinary action.

Signature	**Position**	**Employer**	**Date**

Appendix B

Incident/Accident Reporting Form

COLD STRESS EMERGENCIES

FROSTBITE

Symptoms and Signs

Skin appears white and waxy, noticeable loss of sensation of touch, pressure and pain, skin is less elastic (feels frozen).

Emergency Care Procedures

- Move patient indoors and keep him warm.
- Protect the frostbitten area by covering the site of the injury and handling the affected part with extreme care.
- Extremities can be rewarmed in warm water (100-105 degrees F). The afflicted part should be moved gently and voluntarily during rewarming. Keep the entire patient warm.
- Swelling, blisters or dull purple color indicates a serious injury to the affected part, transport patient to a medical facility.

HYPOTHERMIA

Symptoms and Signs

Uncontrollable shivering (early stages), slow, slurred speech, memory lapses, inability to use hands, frequent stumbling, drowsiness, exhaustion, unconsciousness leading to death.

Emergency Care Procedures

- Move patient indoors to a warm area.
- Call local emergency medical services (EMS).
- Remove all wet clothing and replace with dry articles or blankets.
- Handle patient as gently as possible.
- If patient is alert, slowly give him warm liquids.
- Apply any available heat to trunk of body, avoid rewarming the extremities.
- Treat for shock. Place head lower than feet.
- Transport to hospital as soon as possible.

HEAT STRESS EMERGENCIES

Condition	Muscle Cramps	Breathing	Pulse	Weakness	Skin	Perspiration	Loss of Consciousness
Heat Cramps	Yes	Varies	Varies	Yes	Moist-warm No Change	Heavy	Seldom
Heat Exhaustion	No	Rapid, Shallow	Weak	Yes	Cold Clammy	Heavy	Sometimes
Heat Stroke	No	Deep, then Shallow	Full Rapid	Yes	Dry-hot	Little or None	Often

HEAT CRAMPS

Symptoms and Signs

Severe muscle cramps (usually in legs and abdomen), exhaustion, sometimes dizziness or periods of faintness.

Emergency Care Procedures

- Move patient to a nearby cool place.
- Give patient half strength electrolyte replacement solution, such as Gatorade, or salted water to drink.
- Massage the cramped muscle to help ease the patient's discomfort, massage with pressure.
- Apply moist towels to the patient's forehead and over cramped muscles for added relief.
- If cramps persist, or if more serious signs and symptoms develop, transport the patient to a hospital.

HEAT EXHAUSTION

Symptoms and Signs

Rapid and shallow breathing, weak pulse, cold and clammy skin, heavy perspiration, total body weakness, and dizziness that sometimes leads to unconsciousness.

Emergency Care Procedures

- Move patient to a nearby cool place.
- Keep patient at rest.
- Remove enough clothing to cool patient without chilling him (watch for shivering). fan the patient's skin.
- Give patient half strength electrolyte replacement solution such as Gatorade, or salted water to drink. do not try to administer fluids to and unconscious patient.

ENVIRONMENTAL CHEMICAL

C O R P O R A T I O N

INCIDENT/ACCIDENT REPORTING FORM

JOB NAME: _____ JOB #: _____

LOCATION: _____

DATE OF INCIDENT: _____/_____/_____ TIME OF INCIDENT: _____

EMPLOYEE NAME & TITLE: _____

SUPERVISOR NAME & TITLE: _____

NATURE OF THE INCIDENT: _____

EMPLOYEE DESCRIPTION OF THE INCIDENT: _____

_____

_____

DEGREE AND NATURE OF INJURIES (IF ANY): _____

_____

_____

FIRST AID ADMINISTERED? ☐ YES ☐ NO

LIST FIRST AID ACTIONS: _____

_____

FURTHER MEDICAL TREATMENT NEEDED? ☐ YES ☐ NO

NAME AND ADDRESS OF PHYSICIAN: _____

_____

CITY _____ STATE _____ ZIP CODE _____

PHONE NUMBER _____

IF HOSPITALIZED, NAME AND ADDRESS OF HOSPITAL: _____

_____

CITY _____ STATE _____ ZIP CODE _____

PHONE NUMBER _____

CONTINGENCY ACTIONS TAKEN: _____

_____

_____

SUPERVISOR'S COMMENTS: _____

_____

EMPLOYEE'S SIGNATURE: _____ DATE: _____

SUPERVISOR'S SIGNATURE: _____ DATE: _____

Appendix C

Heat and Cold Stress

- Treat for shock, but do not cover to the pont of overheating the patient.
- If unconscious, fails to recover rapidly, has other injuries, or has a history of medical problems, transport to hospital as soon as possible.

HEAT STROKE

Symptoms and signs

Deep breaths, then shallow breathing; rapid strong pulse, then rapid, weak pulse; dry, hot skin; dilated pupils; loss of consciousness (possible coma); seizures or muscular twitching may be seen.

Emergency Care Procedure

- Cool the patient in any manner rapidly, move the patient out of the sun or away from the heat source. remove patient's clothing and wrap him in wet towels and sheets. Pour cool water over these wrappings,. Body heat must be lowered rapidly or brain cells will die!
- Treat for shock.
- If cold packs or ice bags are available, wrap them and place one under each of the patient's armpits, behind each knee, in the groin, on each wrist and ankle, and on each side for the patient's neck.
- Transport to hospital as soon as possible!
- Monitor vital signs throughout process.

Appendix D
Report of Injury Form

REPORT OF INJURY

CONTRACT SPECIFICATIONS *(NUMBER AND FEATURE)*			DATE OF THIS REPORT
EMPLOYER			
INJURED EMPLOYEE'S NAME		SOCIAL SECURITY NO.	OCCUPATION
AGE	DATE EMPLOYED	DATES OF PREVIOUS INJURIES	
DESCRIBE INJURY/ILLNESS			
DATE OF INJURY	TIME	ATTENDING PHYSICIAN	INJURY CLASSIFICATION MEDICAL ONLY ☐ OTHER ☐
STARTED LOSING *(NEVER DATE OF INJURY)*		DID INJURY RESULT IN DEATH OR PROBABLE PERMANENT DISABILITY?	
RETURN TO WORK *(DATE)**		DATE OR DEATH	
WORKDAYS LOST TIME*		DAYS OF RESTRICTED WORK OR TRANSFER TO OTHER JOB	
*Estimate date of return to full duty to avoid delay in submitting report *(See reverse side for estimating instructions).*			
DESCRIBE ACCIDENT *(Include Who, What, When, Where, and How)*			
SUPERVISORY OPINION	HOW COULD ACCIDENT HAVE BEEN PREVENTED?		
	(Signature) _____ FOREMAN OR IMMEDIATE SUPERVISOR		
PREVENTIVE ACTION TAKEN	ACTION TAKEN TO PREVENT A RECURRENCE		
	(Signature) _____ RESPONSE MANAGER OR SUPERINTENDENT		

Refer to Form 7-2077 in the RSHS for definitions of form terms and for detailed instructions.

Appendix E
Tailgate Safety Meeting

ENVIRONMENTAL CHEMICAL CORPORATION

Exposure Monitoring Log

Type of Monitoring _____ Project _____ Date _____

Instrument _____ Manufacturer _____ Serial No. _____

Time	Person/Location	Result	Comments	Sampled By

Appendix F

Exposure Monitoring Log

ENVIRONMENTAL CHEMICAL CORPORATION
TAILGATE SAFETY MEETING

Project #: _____ **Date:** _____

Site: _____ **Conducted by:** _____

Meeting Safety Topic: _____

ATTENDEES

Name (printed)	Signature	Date

Appendix F

Exposure Monitoring Log